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Claims

1. An apparatus for analysing the condition of a machine having a rotating shaft, comprising:

10 at least one input for receiving measurement data from a sensor for surveying a measuring point of the machine; said measurement data being dependent on rotation of said shaft;

 data processing means for processing condition data dependent on said measurement data; said data processing means comprising means for performing a
15 plurality of condition monitoring functions (F1, F2,Fn), wherein

 said data processing means includes a Field Programmable Gate Array circuit coupled to said at least one input.

2. The apparatus according to claim 1, wherein:

20 said data processing means comprises at least two data processing devices co-operating so as to control operation of said condition analysis apparatus; a first one of said data processing devices being said Field Programmable Gate Array circuit.

3. The apparatus according to claim 1, wherein:

25 a second one of said data processing devices (50A) operates to control the operation of the Field Programmable Gate Array circuit.

4. The apparatus according to claim 1, 2 or 3, further comprising:

 a plurality of memory segments for storing program code; and
30 program code means, stored on at least one of said memory segments, which when run on said Field Programmable Gate Array circuit (50B) causes the condition analysis apparatus to execute a condition monitoring function.

- 5 5. The apparatus according to claim 4 when dependent on claim 3, further comprising:

program code means, stored on at least one of said memory segments, which when run on said second data processing device (50A) causes the second data processing device to control the operation of the Field Programmable Gate Array.

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6. The apparatus according to any of the preceding claims, wherein:

said Field Programmable Gate Array circuit (50B) is programmable to execute said plurality of condition monitoring functions.

- 15 7. The apparatus according to any of the preceding claims, wherein:

at least some of said plurality of condition monitoring functions (F1, F2, Fn) are at least partly embodied by computer program code.

8. The apparatus according to any of the preceding claims, wherein

20 at least one of said condition monitoring functions (F1, F2,Fn) generates said condition data in response to measurement data indicative of vibration.

9. The apparatus according to any of the preceding claims, wherein

25 said at least one input includes an input adapted to receive shock pulse measurement data; said adapted input comprising means for treatment of said shock pulse measurement data and delivery of said treated data to said data processing means.

10. The apparatus according to any of the preceding claims, wherein

30 at least one of said condition monitoring functions (F1, F2,Fn), when running, generates said condition data in response to measurement data indicative of temperature.

11. The apparatus according to claim 10, wherein

5 said at least one input includes an input adapted to receive measurement data indicative of temperature; said adapted input comprising means for treatment of said temperature measurement data and delivery of said treated data to said data processing means.

10 12. The apparatus according to any of the preceding claims, wherein
 said at least one input includes an input adapted to receive an analogue measurement signal indicative of temperature; said apparatus further comprising
 an A/D-converter (44B) which is coupled to receive said analogue temperature measurement signal; and wherein
15 said Field Programmable Gate Array circuit is coupled to receive digital temperature data from said A/D-converter.

 13. The apparatus according to any of the preceding claims, wherein
20 said at least one input includes at least one analogue-to-digital converter coupled so as to enable reception of an analogue signal and delivery of a corresponding digital signal to said data processing means.

 14. The apparatus according to any of the preceding claims, wherein
25 said at least one input includes an input (42D) adapted to receive binary tachometering measurement signals.

 15. The apparatus according to any one of claims 1-8, wherein
 said at least one input for receiving measurement data comprises a
30 plurality of inputs coupled to said Field Programmable Gate Array circuit.

 16. The apparatus according to claim 15, wherein
 said plurality of inputs comprises two or three or more types of inputs selected from the group consisting of shock pulse measurement signal input (42A),

5 temperature signal input (42B), vibration measurement signal input (42C),
tachometering measurement signal input (42D).

17. The apparatus according to any of the preceding claims, wherein
said plurality of condition monitoring functions (F1, F2,Fn) includes two or three or
10 more functions selected from the group consisting of: vibration analysis, temperature
analysis, shock pulse measuring, spectrum analysis of shock pulse measurement
data, Fast Fourier Transformation of vibration measurement data, graphical
presentation of condition data on a user interface, storage of condition data in a
writeable information carrier on said machine, storage of condition data in a
15 writeable information carrier in said apparatus, tachometering, imbalance detection,
misalignment detection.

18. The apparatus according to any of the preceding claims, wherein
said plurality of condition monitoring functions (F1, F2,Fn) includes a function for
20 imbalance detection.

19. The apparatus according to claim 18, wherein
said plurality of condition monitoring functions (F1, F2,Fn) includes a function for
balancing.

25 20. The apparatus according to any of the preceding claims, wherein
said plurality of condition monitoring functions (F1, F2,Fn) includes a function for
misalignment detection.

30 21. The apparatus according to claim 20, wherein
said plurality of condition monitoring functions (F1, F2,Fn) includes a function for
alignment.

22. The apparatus according to any of the preceding claims, wherein

5 at least one of said plurality of condition monitoring functions (F1, F2,Fn) has an enabled state and a disabled state.

23. The apparatus according to any of the preceding claims, having:

an apparatus body; and

10 a display provided on, at or in, said apparatus body.

24. The apparatus according to claim 23, wherein:

said display has a display area of at least 4125 mm².

15 25. The apparatus according to claim 23 or 24, wherein:

said apparatus body has a body volume of less than 1006 250 mm².

26. The apparatus according to any of claims 23 - 25, wherein:

said display has a display area of at least 4800 mm².

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27. The apparatus according to claim 23 or 24, wherein:

said apparatus body has a body volume of less than 800 000 mm².

28. The apparatus according to any of the preceding claims, wherein:

25 said apparatus body is portable; and

said apparatus body is shaped and adapted to enable a one-hand grip;

said apparatus body including user interaction means adapted to enable user interaction by means of said one hand.

30 29. The apparatus according to any of the preceding claims, wherein:

said apparatus body is houses readable and writeable memory means having a storage capacity exceeding 8 megabits.

30. The apparatus according to claim 29, wherein:

5 said storage capacity exceeds 240 megabits.

31. The apparatus according to any of the preceding claims, further comprising:
a logger for registering use of at least one of said condition monitoring
functions (F1, F2,Fn).

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32. The apparatus according to claim 31, further comprising:
a communication port (16); wherein
said apparatus is adapted to be capable of delivering data indicative of said
15 registered use on said communication port (16).

33. The apparatus according to any of the preceding claims, wherein:
at least one of said plurality of condition monitoring functions (F1, F2,Fn) has
an enabled state and a disabled state.

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34. The apparatus according to any of the preceding claims, wherein:
all or several of said plurality of condition monitoring functions (F1, F2,Fn)
have an enabled state and a disabled state such that each of said all or several
condition monitoring functions can be individually enabled or disabled.

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35. The apparatus according to any of claims 31 - 34, further comprising:
means for comparing said registered use with a first reference value,
means for disabling said data processing means or at least one of said
condition monitoring functions (F1, F2,Fn) in response to the outcome of said
30 comparison.

36. The apparatus according to any of claims 31 - 34, further comprising:
key reception means adapted to allow further use of said data processing
means in response to reception of a first key.

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37. The apparatus according to any of claims 1 - 14, further comprising:

key reception means adapted to allow further use of a selected one of said condition monitoring functions (F1, F2,Fn) in response to reception of a key associated with said selected function.

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38. The apparatus according to claim 36 or 37, wherein:

said key reception means includes a communication port (16); and

said key includes a key word comprising information indicative of an amount of usage to be allowed.

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39. The apparatus according to any of claims 33 - 38, further comprising:

a user interface for allowing an operator to indicate a desire to execute a condition monitoring function (F1, F2,Fn);

means for checking whether the indicated function is disabled or enabled;

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means for causing execution of said indicated function when enabled.

40. The apparatus according to any of the preceding claims, wherein:

said logger is adapted to register use of a first condition monitoring function a first rate; and

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said logger is adapted to register use of a second condition monitoring function at a second rate.

41. The apparatus according to claim 40, wherein

said second rate is such that use registered at said second rate causes a higher cost per unit of usage than use registered at said first rate.

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42. The apparatus according to claim 40, wherein

said second rate is such that use registered at said second rate causes a lower cost per unit of usage than use registered at said first rate.

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43. The apparatus according to any of the preceding claims, wherein:

said registered use is a parameter indicative of a number of executions of at least one of said condition monitoring functions (F1, F2,Fn).

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44. The apparatus according to any of the preceding claims, wherein:

said registered use is a parameter indicative of an extent of time.